CALEDON LABORATORY CHEMICALS

MATERIAL SAFETY DATA SHEET

NITRIC ACID

PRODUCT IDENTIFICATION

Chemical Name and Synonyms:
Nitric acid; Hydrogen nitrite; Aqua fortis; Engravers' acid; Azotic acid
Chemical Family:
Inorganic acid
Chemical Formula:
HNO_3
Product Use:
Laboratory chemical
Manufacturer's Name and Address:
Caledon Laboratories Ltd.
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HAZARDOUS INGREDIENTS OF MATERIALS

Ingredients:	*%*	*TLV Units*	*CAS No.*
Nitric acid	*~70*	*2 ppm*	*7697-37-2*

PHYSICAL DATA

Physical State:
Liquid
Odour and Appearance:
Clear, colourless to slightly yellow fuming aqueous solution with a suffocating acrid odour
Odour Threshold (ppm):
0.57 to 2.5 mg/m^3 (detection)
Vapour Pressure (mm Hg):
5.5 mm Hg at 20°C
Vapour Density (Air = 1):
2.3 (at boiling)
Evaporation Rate:
No data
Boiling Point (degrees C):
122°C
Freezing Point (degrees C):
-41°C
pH:
1.0 (0.1M) (strong acid)
Specific Gravity:
1.4072 at 15.5°C (70%)
Coefficient of Water/Oil distribution:
No data

SHIPPING DESCRIPTION

UN:
2031
T.D.G. Class:
8
Pkg. Group:
II

REACTIVITY DATA

Chemical Stability:
Stable when pure. May discolour on exposure to light.
Incompatibility with other substances:
Very reactive. May react violently or explosively with wood, turpentine and other hydrocarbon solvents, finely powdered metals, powdered metals, alkali metals, powders, alcohols, brass, copper and its alloys, galvanized iron, aluminum, bases, reducing agents, H_2S. Can ignite spontaneously, immediately or after delay, in contact with organic solids. Corrosive to almost all metals, except stainless steel, aluminum, gold, platinum-type metals.
Reactivity:
Strong oxidizer, very reactive. Reacts violently or explosively with many products, including acetic acid, acetic anhydride, acetone, acetonitrile, acrylonitrile, alcohols, ammonia, aromatic amines, BrF5, butanethiol, cellulose, crotonaldehyde, copper nitride, cyclohexylamine, dichloromethane, diethyl ether, 1,1-dimethylhydrazine, divinyl ether, fluorine, hydrazine, hydrocarbons, hydrogen iodide, hydrogen peroxide, ion exchange resins, iron (II) oxide, lactic acid, metal acetylides, metals, metal salicylates, 4-methylcyclohexanone, nitroaromatics, nitrobenzene, nitromethane, non-metal hydrides, non-metals, organic matter, phenylacetylene, phosphine derivatives, phosphorus halides, phthalic anhydride/sulphuric acid, polyalkenes, sulphur dioxide, sulphur halides, thioaldehydes, thioketones, thiophene, 2,4,6-trimethyltrioxane. Contact with metals may liberate flammable/explosive hydrogen gas. This powerful oxidant is the compound most frequently involved in hazardous reactions. Avoid all ignition sources, excessive heat, all incompatible or combustible materials, generation of mist.
Hazardous Decomposition Products:
Oxides of nitrogen

FIRE AND EXPLOSION DATA

Flammability:
Non flammable but strong oxidizer. Will enhance the burning rate or cause spontaneous combustion of organic or combustible material. Strong oxidants may explode when shocked or if exposed to heat, flame or friction. May be initiation source for vapour explosions.
Extinguishing Media:
Water as fog or mist in flooding amounts. Water stream may spread fire. Use water to cool containers, disperse vapours, dilute product. Fight fire fromsafe distance and protected location. Firefighters must wear protective equipment and clothing sufficient to prevent inhalation and contact (full face-piece, positive pressure self-contained breathing apparatus, and encapsulating, chemical splash suit; Bunker Gear is not sufficient).
Flash Point (Method Used):
Not applicable
Autoignition Temperature:
Not applicable
Upper Flammable Limit (% by volume):
Not applicable
Lower Flammable Limit (% by volume):
Not applicable
Hazardous Combustion Products:
Toxic gases and vapours (NO_x)
Sensitivity to Impact:
Some reactions may produce shock-sensitive nitrates
Sensitivity to Static discharge:
None identified

TOXICOLOGICAL PROPERTIES AND HEALTH DATA

Toxicological Data:

LD_{50}:

No data

LD_{LO}:
(hum) 430 mg/kg

LC_{50}:
(inh, rat) 3,124 ppm/1h

Effects of Acute Exposure to Product:
Extremely destructive to tissue

Inhaled:
Presence of toxic nitrogen oxides greatly increases the toxicity fo inhaling this substance. Vapour or mist may cause choking, coughing, chest pain, burning of the mouth and throat, and ulceration or perforation of the esophagus. Severity of effects depends on the concentration of acid and nitrogen oxides, and the duration of exposure. Effects may be delayed. Within 24 hours, moderate to severe breathing difficulty and cyanosis may develop and can progress rapidly to bronchopneumonia, pulmonary edema and death.

In contact with skin:
Severe skin burns, blisters. Causes yellowing of the skin. Can cause permanent damage and scarring. Contact with large areas of skin can be fatal if the acid is not removed immediately. Prolonged or repeated contact to dilute solutions may cause irritation, hardening of the skin, dermatitis.

In contact with eyes:
Mist and vapour can cause severe burns, watering, conjunctivitis, ulceration leading to permanent damage, possible blindness.

Ingested:
Severe burns to mouth, throat, esophagus and stomach, nausea, vomiting. Risk of stomach perforation, convulsions, coma and death. Small doses (<10 mL) may cause death. Aspiration into the lungs during ingestion or vomiting may cause severe lung tissue damage, and may be fatal.

Effects of Chronic Exposure to Product:
Prolonged or repeated exposure may cause inflammation of the respiratory tract, chemical pneumonitis and bronchitis, and erosion of tooth enamel.

Carcinogenicity:
Not listed as carcinogen by NTP

Teratogenicity:
No information available

Reproductive Effects:
No information available

Mutagenicity:
Negative in one in vitro test on mammaliam cells.

Synergistic Products:
None known

PREVENTIVE MEASURES

Engineering Controls:
Local, corrosion-proof, exhaust ventilation required.

Respiratory Protection:
Use only in a chemical fumehood. Up to 25 ppm: NIOSH/OSHA approved continuous-flow supplied-air respirator. Up to 50 ppm: air-purifying, full facepiece respirator with canister for nitric acid. For higher or unknown concentrations, as in fire or spill conditions, full face-piece supplied-air respirator with auxiliary positive-pressure self-contained breathing apparatus or full face-piece, postive-pressure self-contained breathing apparatus.

Eye Protection:
Chemical goggles, face shield

Skin Protection:
Teflon™, CPF3™, Tychem 10000™ gloves. Other impervious clothing, apron, sleeves, coverall, boots sufficient to prevent any contact.

Other Personal Protective Equipment:
Safety showers and eye wash fountains in storage and handling area.

Leak and Spill Procedure:
Evacuate area. Eliminate all sources of ignition. Keep away from all combustible and organic materials. Cleanup crew must be thoroughly trained in the hazards of this product and its safe use, and must wear respiratory equipment and impervious protective clothing sufficient to prevent inhalation of mists, fumes or vapours, and all contact. ***DO NOT WORK ALONE WITH THIS PRODUCT.*** *Stop the discharge if possible and contain by constructing barriers. Keep from entering sewers or waterways. Absorb on sand or vermiculite and place in closed containers for disposal, reclamation or neutralization. Product can be neutralized with sodium bicarbonate, but this reaction will produce copious amounts of carbon dioxide; ensure adequateventilation. Contaminated absorbent may pose the same hazards as the product. Ventilate area and wash site with plenty of water.*

Waste Disposal:
Follow all federal, provincial, and local regulations.

Handling Procedures and Equipment:
CORROSIVE, OXIDIZER, TOXIC. Persons working with this product must be thoroughly trained in its hazards and its safe use. ***Do not work alone with this product.*** *Wear appropriate personal protective equipment. Keep away from all combustible or incompatible materials. Use the smallest amount possible for the purpose. Avoid contact with liquid or vapours. Keep away from all sources of heat and ignition. When diluting,* ***always add acid to water, not water to acid****. Heat is generated by dilution. Caution: empty containers may contain hazardous residues; treat with caution.*

Storage Requirements:
Store in suitable, labelled containers, a cool, dry, well-ventilated area, out of direct sunlight and away from incompatible or combustible materials, heat or ignition sources. Store in stainless steel drums. Attacks some forms of rubber, coatings and plastics. Keep tightly closed. Protect from damage, and inspect frequently for signs of damage, corrosion, or leaks. Storage area should be made of non-combustible material and should have raised sills with trenching to a safe area

FIRST AID MEASURES

SPEED IN REMOVING NITRIC ACID FROM CONTACT WITH TISSUE IS OF PRIMARY IMPORTANCE. IN ALL CASES OF CONTACT, DELAY CAN RESULT IN SERIOUS INJURIES.

Specific Measures:

Eyes:
IMMEDIATELY FLUSH EYES with gently running water for at least twenty to thirty (20-30) minutes, holding eyelids open while flushing. Take care not to flush contaminated water into unaffected eye. Wear protective gloves to prevent contact during first aid procedures. Get medical attention immediately. Flushing may be continued while casualty is transported to medical facility.

Skin:
Remove contaminated clothing (including shoes, watches, belts and rings), under running water. IMMEDIATELY FLUSH the exposed area with running water for at least twenty to thirty (20-30) minutes. Wear protective gloves to prevent contact during first aid procedures. Get medical attention immediately. Wash or discard contaminated clothing, including leather

goods, before reuse.

Inhalation:

IMMEDIATELY remove to fresh air (caution must be used by rescuers to avoid exposure to the contaminating fumes). Give oxygen for breathing difficulty. If breathing has STOPPED give artificial respiration. If breathing and pulse are ABSENT, give CPR. IMMEDIATELY CONTACT A PHYSICIAN. Stay with casualty until medical help arrives. Second rescuer should obtain oxygen equipment and ambulance. Lung damage can occur up to 48 hours after exposure; monitor victim during this period.

Ingestion:

DO NOT INDUCE VOMITING. If casualty is alert and not convulsing, rinse mouth with water and give 1 to 2 glasses of water or milk to dilute material. IMMEDIATELY OBTAIN MEDICAL ATTENTION. If spontaneous vomiting occurs; have casualty lean forward with head down to avoid breathing in of vomitus, rinse mouth thoroughly and administer 1 to 2 glasses of water or milk.

REFERENCES USED

CCINFO disc

Budavari: The Merck Index, 12th ed., 1997

Royal Society of Chemistry: Chemical Safety Data Sheets, Vol. 3, 1990

Sax, Lewis: Hawley's Condensed Chemical Dictionary, 11th ed., 1987

Suppliers' Material Safety Data Sheets

ADDITIONAL INFORMATION

Date Issued:

March 10, 1989

Revision:

October 2012

MSDS:

7525-1, 7525-8, 7526-2, 7527-2

Proposed WHMIS Designation:

C; D1A; D2A; E

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